Patient Appointment Scheduling at Hemodialysis Centers: an Exact Branch and Price Approach

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Abstract

Scheduling patient appointments at a hemodialysis center is a unique challenge, unlike other healthcare appointment scheduling problems. Patients require a series of dialysis treatment sessions rather than a single appointment. We formulate this multiple-appointment system as a set-partitioning model and solve it using a branch-and-price algorithm. Since dynamic programming doesn't perform very well for solving the pricing subproblem, we further decompose it and solve it using a novel column-generation-based approach. Additionally, we design a greedy heuristic to improve the computational efficiency of the algorithm.

Keywords
Patient Appointment Scheduling, Hemodialysis Centers, Exact Branch, Price Approach.